

Appl. No. 09/773,172  
Amdr. dated Feb. 3, 2004  
Reply to Office Action of Nov. 3, 2003  
Docket No. 6169-212

IBM Docket No. BOC9-2000-0076

### REMARKS/ARGUMENTS

These remarks are made in response to the final Office Action of November 3, 2003 (Office Action). As this response is timely filed within the three-month shortened statutory period for reply, no fee is believed due.

In paragraph 2 of the Office Action, claims 8-11 and 19-24 have been rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,311,159 to Van Tichelen *et al.* (Van Tichelen). In paragraph 4, claims 1-30 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,510,414 to Chaves (Chaves) in view of Van Tichelen.

The Applicant has amended claims 8, 19, 23, and 27. These amendments illustrate that the present invention can convert DTMF signals to one of a plurality of different text representations. For example, the DTMF string "10" can be translated to "one zero" or "ten" based upon the prosodic analysis and grouping steps. The Applicant also has added claims 31-34 clarifying that, in one embodiment, the prosodic characteristic can be determined by measuring a time period between at least two of the dual tone multi-frequency (DTMF) signals. No new matter has been added.

Prior to addressing the rejections on the art, a brief review of the Applicant's invention is appropriate. The Applicant has invented a method, system, and apparatus for processing user inputs including DTMF signals. In particular, the present invention can analyze prosodic information corresponding to received DTMF signals and group the signals based on the prosodic information. The DTMF signals then can be converted to one of a plurality of different text representations based upon the grouping step.

In illustration, when receiving a series of DTMF signals specifying the digit sequence "102070", the timing between each received digit can be determined. Rather than converting the digit sequence to text as follows: "one zero two zero seven zero", the digits can be grouped according to the time detected between each respective digit. For example, digits received in close succession can be grouped together while detected pauses or longer periods of time can be used to separate digit groupings. In consequence, if pauses are detected as follows: "10" <pause> "20" <pause> "70", the digit sequence can be converted to the text representation "ten", "twenty", and "seventy".

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With respect to independent claims 8, 19, and 23, the Office Action asserts the following:

Van Tichelen teaches a speech layer converting DTMF tones into representative text based codes, inherently first determining one or more prosodic characteristics of said DTMF signal, as well as Automatic Speech Recognition converting into text for data input (col. 1, lines 60-67 and col. 3, lines 1-7), as well as "converting, with a natural language understanding module", inherently providing contextual feedback, "text messages from the speech layer into representative semantic meaning messages" (col. 3, lines 12-16).

The passages cited by the Office Action, however, include absolutely no discussion or suggestion of a prosodic analysis being performed upon DTMF signals as is explicitly claimed by the Applicant. The Examiner contends, however, that such an analysis is inherent to a speech recognition module and/or a natural language understanding module.

The Applicant strongly disagrees that a prosodic analysis is inherent to the cited passages of Van Tichelen. Moreover, the prosodic analysis being performed in the Applicant's invention is a prosodic, or timing, analysis of the DTMF signals. Newly added claims 31-34 clarify that such an analysis can be performed by measuring time periods between DTMF signals. Prosodic analysis of DTMF signals is not inherent to a speech recognition module and/or a natural language understanding module.

Significantly, neither a speech recognition module nor a natural language module is intended to process DTMF signals. A speech recognition module processes speech and a natural language module processes text. Consequently, Van Tichelen fails to teach or suggest, inherently or otherwise, that a prosodic characteristic can be determined from DTMF signals.

As Van Tichelen fails to teach or suggest any sort of prosodic analysis, particularly one directed to DTMF signals, Van Tichelen also fails to teach or suggest that selected ones of the DTMF signals can be grouped according to the determining step (prosodic analysis) and that the DTMF signals can be converted to one of a plurality of different text representations according to the grouping step. As noted, such a process can ensure that a DTMF string of "102070" can be converted to "ten twenty seventy" rather than "one zero two zero seven zero" based upon the detected time periods and/or pauses between the DTMF signals. Van Tichelen provides no such teaching or suggestion. Further, the Applicant requests that the Examiner indicate, with

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particularity, those portions of Van Tichelen which teach or suggest each limitation of the independent claims.

In light of the foregoing, withdrawal of the 35 U.S.C. § 102(e) rejection with respect to claims 8-11 and 19-25 is respectfully requested.

Regarding the 35 U.S.C. § 103(a) rejection of claims 1-30 as being unpatentable over Chaves in view of Van Tichelen, the Examiner contends that "Chaves teaches determining whether an audio input signal is a dual tone multi-frequency (DTMF) signal or human speech and converting them to equivalent text, necessarily first determining one or more prosodic characteristics of said DTMF signal", citing column 2, lines 32-40 and column 4, line 66 – column 5, line 4 for support.

Chaves, however, suffers from the same deficiencies as Van Tichelen. In particular, Chaves fails to teach or suggest any sort of prosodic analysis of DTMF signals, a grouping of those signals based upon the prosodic analysis, or a conversion to one of a plurality of different text representations of the DTMF signals based upon the grouping.

In illustration, column 2, lines 32-40 of Chaves states only that telephone keypad information can be received by a call center agent. Column 4, line 66 – column 5, line 4 states only that a speech recognition application includes systems that can recognize speech and DTMF signals to convert each to text.

What is utterly lacking from the cited passages is any teaching or suggestion that Chaves performs any sort of prosodic analysis of DTMF signals or converts DTMF signals to text based upon such an analysis.

Still, the Examiner contends that because Chaves distinguishes between speech and DTMF signals, Chaves necessarily determines prosodic characteristics of DTMF signals. The Applicant again disagrees. While the Applicant has not located where in the cited reference it is disclosed how speech is discerned from DTMF signals, it would seem that the two different signal types could be easily differentiated based upon a frequency analysis. As is known, each DTMF signal includes two specific tones that can be easily differentiated from speech using a frequency analysis. Accordingly, the Applicant disagrees that Chaves necessarily determines prosodic characteristics of DTMF signals.

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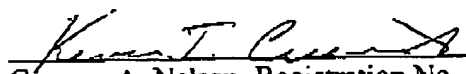
As neither Chaves, Van Tichelen, nor any combination thereof teaches or suggests the features of the present invention as claimed, withdrawal of the 35 U.S.C. § 103(a) rejection regarding claims 8-11 and 19-30 is respectfully requested.

The Applicant further submits that claims 31-34 also are patentable over the cited art.

The Applicants believe that this application is now in full condition for allowance, which action is respectfully requested. The Applicants request that the Examiner call the undersigned if clarification is needed on any matter within this Response, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

Date: 2/3/04

  
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